

WHAT IS CLAIMED IS:

1. An ESD protection circuit comprising:

a first pad which is used as an external connection terminal to be connected to a semiconductor  
5 integrated circuit;

a second pad which is used as an external connection terminal to be connected to the semiconductor integrated circuit;

10 a clamp circuit connected between the first pad and the second pad; and

a control circuit which is configured to control the clamp circuit, rendering the same conducting or non-conducting.

15 2. The ESD protection circuit according to claim 1, wherein the clamp circuit includes a switch element which is rendered to be conducting or non-conducting in accordance with a control signal output from the control circuit.

20 3. The ESD protection circuit according to claim 1, wherein the clamp circuit includes an inverter circuit which receives a control signal from the control circuit, and a switch circuit which is turned on or off by an output signal of the inverter circuit.

25 4. The ESD protection circuit according to claim 3, wherein the inverter circuit comprises a first MOS transistor of a first conductivity type, whose source is connected to the first pad and whose gate is

connected to receive the control signal from the control circuit, and a second MOS transistor of a second conductivity type, whose drain is connected to a drain of the first MOS transistor, whose source is  
5 connected to the second pad, and whose gate is connected to receive the control signal from the control circuit.

5. The ESD protection circuit according to claim 3, wherein the switch circuit comprises a third  
10 MOS transistor of the second conductivity type, whose drain is connected to the first pad, whose source is connected to the second pad, and whose gate is connected to an output terminal of the inverter circuit.

15 6. The ESD protection circuit according to claim 4, wherein the switch circuit comprises a third MOS transistor of the second conductivity type, whose drain is connected to the first pad, whose source is connected to the second pad, and whose gate is  
20 connected to an output terminal of the inverter circuit.

7. The ESD protection circuit according to claim 3, wherein the switch circuit comprises an NPN bipolar transistor whose collector is connected to the  
25 first pad, whose emitter is connected to the second pad and whose base is connected to an output terminal of the inverter circuit.

8. The ESD protection circuit according to claim 3, wherein the switch circuit comprises a PNP bipolar transistor whose emitter is connected to the first pad, whose collector is connected to the second pad and whose base is connected to an output terminal of the inverter circuit.

9. The ESD protection circuit according to claim 3, wherein the switch circuit comprises a thyristor whose anode and cathode are connected between the first pad and the second pad, and a trigger circuit which supplies a trigger current to the thyristor to turn on or off the thyristor.

10. The ESD protection circuit according to claim 8, wherein the trigger circuit comprises a fourth MOS transistor of a second conductivity type, whose source is connected to the first pad and whose gate is connected to an output terminal of the inverter circuit, and a first resistor element which is connected at one end to a drain of the fourth transistor and at the other end to the second pad.

11. The ESD protection circuit according to claim 9, wherein the trigger circuit comprises a fourth MOS transistor of a second conductivity type, whose source is connected to the first pad and whose gate is connected to an output terminal of the inverter circuit, and a first resistor element which is connected at one end to a drain of the fourth .

transistor and at the other end to the second pad.

12. The ESD protection circuit according to claim 1, wherein the control circuit renders the clamp circuit conducting when no power is supplied to the semiconductor integrated circuit, and renders the clamp circuit non-conducting when power is supplied to the semiconductor integrated circuit.

13. The ESD protection circuit according to claim 1, wherein a third pad is further provided and connected to the control circuit, and the control circuit renders the clamp circuit conducting when no potential is applied to the third pad, and renders the clamp circuit non-conducting when a predetermined potential is applied to the third pad.

14. The ESD protection circuit according to claim 13, wherein the control circuit includes a load circuit connected at one end to the third pad and at the other end to a first potential source which generates the predetermined potential.

15. The ESD protection circuit according to claim 14, wherein the load circuit includes a second resistor element.

16. The ESD protection circuit according to claim 1, wherein the control circuit comprises a programmable circuit which is programmed in accordance with whether a semiconductor chip including the semiconductor integrated circuit has been incorporated

into an end product, and renders the clamp circuit conducting or non-conducting in accordance with data programmed in the programmable circuit.

17. The ESD protection circuit according to  
5 claim 16, wherein the programmable circuit comprises a fuse circuit which has a fuse element that is cut after the semiconductor chip is incorporated into the end product, and the semiconductor chip has fourth and fifth pads which supply a current to the fuse element  
10 to cut the fuse element after the semiconductor chip is incorporated into the end product.

18. The ESD protection circuit according to  
claim 17, wherein the fuse circuit includes a third resistor element which is connected between one end of  
15 the fuse element and a first potential source that generates a first potential, and a fourth resistor element which is connected between the other end of the fuse element and a second potential source that generates a second potential.